CLAIMS

I CLAIM:

1. A method for producing a cathode mixture having manganese oxide particles, comprising:

providing a first chemical compound having manganese;

providing an organic reducing agent having a single carbon atom;

mixing the first chemical compound with the reducing agent to yield a sol of manganese oxide particles; and

adding the sol to a carbon slurry to produce a carbon slurry with suspended manganese oxide particles.

2. The method as recited in claim 1, wherein the first chemical compound comprises potassium permanganate.

3. The method as recited in claim 1, wherein the reducing agent comprises sodium formate.

4. The method as recited in claim 1, wherein the reducing agent is selected from the group consisting of formic acid and formaldehyde.

5. The method as recited in claim 1, wherein the mixing step is carried out approximately at a neutral pH level.

6. The method as recited in claim 1, wherein the sol contains manganese dioxide particles.

7. The method as recited in claim 1, wherein the carbon slurry comprises a mixture of activated carbon and carbon black.

8. The method as recited in claim 7, wherein the activated carbon and carbon black have a BET surface area of approximately 900 m^2/g and 1500 m^2/g, respectively.

9. The method as recited in claim 1, wherein a plurality of the manganese oxide particles have a size between 20 to 26 micrometers.

10. A method for producing a cathode having manganese oxide particles, comprising:

providing a first chemical compound having manganese;

providing an organic reducing agent having a single carbon atom;

mixing the first chemical compound with the reducing agent to yield a sol of manganese oxide particles;

adding the sol to a carbon slurry to produce a suspension of carbon slurry containing manganese oxide particles;

mixing a waterproofing agent to the suspension to produce a cathode compound; and

drying and rolling the cathode compound.

11. The method as recited in claim 10, wherein the waterproofing agent is selected from the group consisting of Teflon T-30 and polyethylene.

12. The method as recited in claim 10, further comprising laminating the cathode compound with a screen on one side and an air diffusion layer on a second side opposite the first side.

13. The method as recited in claim 12, further comprising attaching a separator to the screen.

14. The method as recited in claim 10, further comprising installing the cathode in a metal-air cell.

15. The method as recited in claim 14, wherein the metal-air cell is a zinc-air cell.

16. The method as recited in claim 14, wherein the metal air-cell is a button cell.

17. A method for producing a cathode mixture having manganese oxide particles, comprising:

providing a first chemical compound having manganese;

providing an organic reducing agent;

mixing the first chemical compound with the reducing agent to yield a sol of manganese oxide particles; and

adding the manganese oxide compound to a carbon slurry to produce a suspension of carbon slurry with suspended manganese oxide particles.

18. The method as recited in claim 17, wherein the reducing agent is organic having a single carbon atom.